

Patent Claims:

1 – 18 (canceled)

19. (new) A method for producing a complete three-dimensional molded body, layer by layer, from a plurality of partial quantities in the form of layers of a starting material that produce the complete molded body, comprising:

melting and directionally solidifying the starting material;

predetermining a crystalline structure for the three-dimensional molded body with a starting plate having a specific crystalline structure; and

compacting the layers by a directional solidification by epitaxial growth,

whereby the partial quantities of the starting material are bonded together.

20. (new) The method as claimed in claim 19, wherein a compaction treatment is carried out with a partial quantity.

21. (new) The method as claimed in claim 20, wherein a thermal compaction treatment is performed.

22. (new) The method as claimed in claim 19, wherein a laser is used to bond the partial quantities.

23. (new) The method as claimed in claim 20, wherein a laser is used for the compaction treatment.

24. (new) The method as claimed in claim 19, wherein a powder compact, a metal sheet, or a metal foil is used as the partial quantity.

25. (new) The method as claimed in claim 19, wherein a three-dimensional molded body with grain boundaries is formed by the directional solidification and the grain boundaries oriented in one direction.

26. (new) The method as claimed in claim 19, wherein a monocrystalline three-dimensional molded body is formed by the directional solidification.

27. (new) The method as claimed in claim 19, wherein the three-dimensional molded body is produced having a material gradient.

28. (new) The method as claimed in claim 27, wherein at least one of the partial quantities has a material gradient.

29. (new) The method as claimed in claim 27, wherein a material supply is used to supply material for the molded body and the material gradient is produced by controlling the material supplies in terms of time and location.

30. (new) The method as claimed in claim 27, wherein a material supply is used to supply material for the molded body and the material gradient is produced by controlling the material supplies in terms of time or location.

31. (new) The method as claimed in claim 27, wherein at least one material supply for the supply of partial quantities of at least one starting material is used, and the starting material is supplied by the at least one material supply during a specific time period, the material composition of the starting material that is supplied by the at least one material supply changing during this time period so that a material gradient is created in the partial quantities.

32. (new) The method as claimed in claim 27, wherein the partial quantities for the starting material are supplied by at least two material supplies, a first material supply providing a first material composition and a second material supply providing a second material composition, and the two material supplies providing respective material at different locations so that a material gradient is created in the partial quantities.

33. (new) The method as claimed in claim 23, wherein a geometry of the three-dimensional moulded body is established by a movement of a plurality of laser beams of the laser over the partial quantities.

34. (new) The method as claimed in claim 19, wherein an additional heater is used to heat the starting plate or the starting material or to keep it at a certain temperature.

35. (new) The method as claimed in claim 19, wherein an additional heater is used to heat the starting plate and the starting material or to keep it at a certain temperature.

36. (new) The method as claimed in claim 19, wherein the moulded body is formed only from partial quantities in the form of layers.

37. (new) The method as claimed in claim 19, wherein the partial quantities, in the form of layers, have a thickness ranging from 0.1 mm to 1 cm.

38. (new) The method as claimed in claim 19, wherein the molded body is longer perpendicularly to a plane in which the partial quantities in the form of layers extend than the extent of the molded body in this plane.